

IN THE CLAIMS:

Please amend the claims as follows. The claims are in the format as required by 35 C.F.R. § 1.121.

1-14 Cancelled

15. (Previously Presented) A storage router for providing virtual local storage on remote storage devices to a device, comprising:

a buffer providing memory work space for the storage router;

a first Fibre Channel controller operable to connect to and interface with a first Fibre Channel transport medium;

a second Fibre Channel controller operable to connect to and interface with a second Fibre Channel transport medium; and

a supervisor unit coupled to the first and second Fibre Channel controllers and the buffer, the supervisor unit operable:

to maintain a configuration for remote storage devices connected to the second Fibre Channel transport medium that maps between the device and the remote storage devices and that implements access controls for storage space on the remote storage devices; and

to process data in the buffer to interface between the first Fibre Channel controller and the second Fibre Channel controller to allow access from Fibre Channel initiator devices to the remote storage devices using native low level, block protocol in accordance with the configuration.

16. (Previously Presented) The storage router of claim 15, wherein the configuration maintained by the supervisor unit includes an allocation of subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device.

17. (Previously Presented) The storage router of claim 16, wherein the Fibre Channel devices comprise workstations.

18. (Previously Presented) The storage router of claim 16, wherein the remote storage devices comprise hard disk drives.

19. (Previously Presented) The storage router of claim 15, wherein each of the first Fibre Channel controller comprises:

- a Fibre Channel (FC) protocol unit operable to connect to the Fibre Channel transport medium;
- a first-in-first-out queue coupled to the Fibre Channel protocol unit; and
- a direct memory access (DMA) interface coupled to the first-in-first-out queue and to the buffer.

20. (Previously Presented) A storage network, comprising:

- a first Fibre Channel transport medium;
- a second Fibre Channel transport medium;
- a plurality of workstations connected to the first Fibre Channel transport medium;
- a plurality of storage devices connected to the second Fibre Channel transport medium;

and

a storage router interfacing between the first Fibre Channel transport medium and the second Fibre Channel transport medium, the storage router providing virtual local storage on the storage devices to the workstations and operable:

- to map between the workstations and the storage devices;
- to implement access controls for storage space on the storage devices; and
- to allow access from the workstations to the storage devices using native low level, block protocol in accordance with the mapping and access controls.

21. (Previously Presented) The storage network of claim 20, wherein the access controls include an allocation of subsets of storage space to associated workstations, wherein each subset is only accessible by the associated workstation.

22. (Previously Presented) The storage network of claim 20, wherein the storage devices comprise hard disk drives.

23. (Previously Presented) The storage network of claim 20, wherein the storage router comprises:

- a buffer providing memory work space for the storage router;
- a first Fibre Channel controller operable to connect to and interface with the first Fibre Channel transport medium, the first Fibre Channel controller further operable to pull outgoing

data from the buffer and to place incoming data into the buffer;

a second Fibre Channel controller operable to connect to and interface with the second Fibre Channel transport medium, the second Fibre Channel controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer; and

a supervisor unit coupled to the first and second Fibre Channel controllers and the buffer, the supervisor unit operable:

to maintain a configuration for the storage devices that maps between workstations and storage devices and that implements the access controls for storage space on the storage devices; and

to process data in the buffer to interface between the first Fibre Channel controller and the second Fibre Channel controller to allow access from workstations to storage devices in accordance with the configuration.

24. (Previously Presented) A method for providing virtual local storage on remote storage devices to Fibre Channel devices, comprising:

interfacing with a first Fibre Channel transport medium;

interfacing with a second Fibre Channel transport medium;

maintaining a configuration for remote storage devices connected to the second Fibre Channel transport medium that maps between Fibre Channel devices and the remote storage devices and that implements access controls for storage space on the remote storage devices; and

allowing access from Fibre Channel initiator devices to the remote storage devices using native low level, block protocol in accordance with the configuration.

25. (Previously Presented) The method of claim 24, wherein maintaining the configuration includes allocating subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device.

26. (Previously Presented) The method of claim 25, wherein the Fibre Channel devices comprise workstations.

27. (Previously Presented) The method of claim 25, wherein the remote storage devices comprise hard disk drives.

28. (Previously Presented) An apparatus for providing virtual local storage on a remote storage device to a device operating according to a Fibre Channel protocol, comprising:  
a first controller operable to connect to and interface with a first transport medium, wherein the first transport medium is operable according to the Fibre Channel protocol;  
a second controller operable to connect to and interface with a second transport medium, wherein the second transport medium is operable according to the Fibre Channel protocol; and

a supervisor unit coupled to the first controller and the second controller, the supervisor unit operable to control access from the device connected to the first transport medium to the remote storage device connected to the second transport medium using native low level, block protocols according to a map between the device and the remote storage device.

29. (Previously Presented) The apparatus of Claim 28, wherein the supervisor unit is further operable to maintain a configuration wherein the configuration includes the map between the device and the remote storage device, and further wherein the map includes virtual LUNs that provide a representation of the storage device.

30. (Previously Presented) The apparatus of Claim 29, wherein the map only exposes the device to LUNs that the device may access.

31. (Previously Presented) The apparatus of Claim 28, wherein the supervisor unit is further operable to maintain a configuration including the map, wherein the map provides a mapping from a host device ID to a virtual LUN representation of the remote storage device to a physical LUN of the remote storage device.

32. (Previously Presented) The apparatus of Claim 28, wherein the remote storage device further comprises storage space partitioned into virtual local storage for the device connected to the first transport medium.

33. (Previously Presented) The apparatus of Claim 32, wherein the supervisor unit is further operable to prevent the device from accessing any storage on the remote storage device that is not part of a virtual local storage partition assigned to the device

34. (Previously Presented) The apparatus of Claim 28, wherein the first controller and the second controller further comprise a single controller.

35. (Previously Presented) A system for providing virtual local storage on remote storage devices, comprising:

- a first controller operable to connect to and interface with a first transport medium operable according to a Fibre Channel protocol;

- a second controller operable to connect to and interface with a second transport medium operable according to the Fibre Channel protocol;

- at least one device connected to the first transport medium;

- at least one storage device connected to the second transport medium; and

- an access control device coupled to the first controller and the second controller, the access control device operable to:

- map between the at least one device and a storage space on the at least one storage device; and

- control access from the at least one device to the at least one storage device using native low level, block protocol in accordance with the map.

36. (Previously Presented) The system of Claim 35, wherein the access control device is further operable to maintain a configuration wherein the configuration includes the map between the at least one device and the at least one storage device, and further wherein the map includes virtual LUNs that provide a representation of the at least one storage device.

37. (Previously Presented) The system of Claim 36, wherein the map only exposes the at least one device to LUNs that the at least one device may access.

38. (Previously Presented) The system of Claim 35, wherein the access control device is further operable to maintain a configuration including the map, wherein the map provides a mapping from a host device ID to a virtual LUN representation of the at least one storage device to a physical LUN of the at least one storage device.

39. (Previously Presented) The system of Claim 35, wherein the at least one storage device further comprises storage space partitioned into virtual local storage for the at least one device.

40. (Previously Presented) The system of Claim 39, wherein the access control unit is further operable to prevent at least one device from accessing any storage on the at least one storage device that is not part of a virtual local storage partition assigned to the at least one device.

41. (Previously Presented) The system of Claim 35, wherein the first controller and the second controller further comprise a single controller.

42. (Previously Presented) A method for providing virtual local storage on remote storage devices, comprising:

mapping between a device connected to a first transport medium and a storage device connected to a second transport medium, wherein the first transport medium and the second transport medium operate according to a Fibre Channel protocol;

implementing access controls for storage space on the storage device; and

allowing access from the device connected to the first transport medium to the storage device using native low level, block protocols.

43. (Previously Presented) The method of Claim 42, further comprising maintaining a configuration wherein the configuration includes a map between the device and the one storage device, and further wherein the map includes virtual LUNs that provide a representation of the storage device.

44. (Previously Presented) The method of Claim 43, wherein the map only exposes the device to LUNs that the device may access.

45. (Previously Presented) The method of Claim 42, further comprising maintaining a configuration including a map from a host device ID to a virtual LUN representation of the storage device to a physical LUN of the storage device.

46. (Previously Presented) The method of Claim 42, further comprising partitioning storage space on the storage device into virtual local storage for the device.

47. (Previously Presented) The method of Claim 46, further comprising preventing the device from accessing any storage on the storage device that is not part of a virtual local storage partition assigned to the device.

48. (Previously Presented) A system for providing virtual local storage, comprising:  
a host device;  
a storage device remote from the host device, wherein the storage device has a storage space;  
a first controller;  
a second controller  
a first transport medium operable according to a Fibre Channel protocol, wherein the first transport medium connects the host device to the first controller;  
a second transport medium operable according to the Fibre Channel protocol, wherein the second transport medium connects the second controller to the storage device;  
a supervisor unit coupled to the first controller and the second controller, the supervisor unit operable to:  
maintain a configuration that maps between the host device and at least a portion of the storage space on the storage device; and  
implement access controls according to the configuration for the storage space on the storage device using native low level, block protocol.

49. (Previously Presented) The system of Claim 48, wherein the supervisor unit is further operable to:  
maintain a configuration that maps from the host device to a virtual representation of at least a portion of the storage space on the storage device to the storage device; and  
allow the host device to access only that portion of the storage space that is contained in the map.

50. (Previously Presented) The system of Claim 49, wherein the configuration comprises a map from a host device ID to a virtual LUN representation of the storage device to a physical LUN of the storage device.

51. (Previously Presented) The system of Claim 48, wherein the storage device further comprises storage space partitioned into virtual local storage for the host device.

52. (Previously Presented) The system of Claim 51, wherein the supervisor unit is further operable to prevent the host device from accessing any storage on the storage device that is not part of a virtual local storage partition assigned to the host device.

53. (Previously Presented) The apparatus of Claim 48, wherein the first controller and the second controller further comprise a single controller.